

1.2 Algebraic Expressions and Models

Numerical Expression: consists of numbers, operations, and grouping symbols

The diagram illustrates the expansion of the power 2^5 . On the left, the expression 2^5 is shown. An upward arrow points from the word "Base" to the number 2, and another upward arrow points from the word "Exponent" to the number 5. To the right of 2^5 is an equals sign followed by the product $2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$. A large curly brace is drawn underneath this product, with the text "5 factors of 2" centered below it.

$$2^5 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

Base Exponent

5 factors of 2

*Note: the expression 2^5 is a power

Powers

Phrases

x to the first power

x to the second power, or x squared

x to the third power, or x cubed

x to the fourth power

and so on...

Expressions

$$x^1$$

$$x^2$$

$$x^3$$

Order of Operations

Left to Right

P
P
R
A
S
I
+
I
+
E
S

E
X
P
O
N
E
N
T
S

R
A
D
I
C
A
L
S

M
U
L
T
I
P
L
Y
A
T
I
O
N

D
I
V
I
S
I
O
N

A
D
D
I
T
I
O
N

S
U
B
T
R
A
C
T
I
O
N

Ex 1: Solve using PERMDAS

$$10 \bullet 3 + 6 \div 2$$

$$= 30 + 6 \div 2$$

$$= 30 + 3$$

$$= \boxed{33}$$

Ex 2:

$$16 \div (2 + 6) \bullet 10^2$$

$$= 16 \div 8 \cdot 10^2$$

$$= 16 \div 8 \cdot 100$$

$$= 2 \cdot 100 = \boxed{200}$$

Evaluating Expressions

Variable: a letter that is used to represent one or more numbers

Value of the Variable: any number used to replace the variable

Algebraic Expression: an expression involving variables

Ex 3: Evaluate

$$x^2 + 5 - x$$

when $x = 5$

$$= 25 + 5 - 5$$
$$= 25$$

Ex 4: Evaluate

$$(y-2)^2 \bullet 10 + 21 \div y \quad \text{when } y = 3$$

$$= (3-2)^2 \cdot 10 + 21 \div 3$$

$$= 1^2 \cdot 10 + 21 \div 3$$

$$= \underbrace{1 \cdot 10}_{10} + \underbrace{21 \div 3}_{7}$$

$$= \underbrace{10}_{10} + \underbrace{7}_{7}$$

$$= \boxed{17}$$

Homework: p.14 #15-35 odd